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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/676,728	09/30/2003	Daniel Wayne Bedell	HSJ9-2003-0126US1	2947
74216	7590	06/30/2008		
The Patent Law Office of Larry Guernsey P.O. Box 720247 San Jose, CA 95172				
EXAMINER				
TUGBANG, ANTHONY D				
ART UNIT		PAPER NUMBER		
3729				
MAIL DATE		DELIVERY MODE		
06/30/2008		PAPER		

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

# Office Action Summary

**Application No.**

10/676,728

**Applicant(s)**

BEDELL ET AL.

**Examiner**

A. Dexter Tugbang

**Art Unit**

3729

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 12 April 2008.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-14 is/are pending in the application.
- 4a) Of the above claim(s) 11, 12 and 14 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-10 and 13 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-8508)
- Paper No(s)/Mail Date \_\_\_\_\_

- 4) ☐ Interview Summary (PTO-413)
- Paper No(s)/Mail Date \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: \_\_\_\_\_

## **DETAILED ACTION**

### ***Continued Examination Under 37 CFR 1.114***

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(c), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(c) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on April 12, 2008 has been entered.
2. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

### ***Election/Restrictions***

3. Claims 11, 12 and 14 continue to stand as being withdrawn from further consideration pursuant to 37 CFR 1.142(b) as being drawn to a nonelected invention, there being no allowable generic or linking claim. Election was made **without** traverse in the reply filed on April 9, 2007.

### ***Claim Rejections - 35 USC § 103***

4. Claims 1, 2 and 4 through 9 are rejected under 35 U.S.C. 103(a) as being unpatentable over the combination of Mallary 5,103,553, Cohen et al 5,141,623, and Aboaf et al 6,038,110.

Mallary discloses a method for fabricating a write pole tip for perpendicular recording (col. 1, lines 43-44) comprising: fabricating a P1 write pole (e.g. 12, in Fig. 1), coils (e.g. 25), and a P2 flux shaping layer (e.g. 16, col. 3, lines 23-24); depositing a P3 layer (e.g. 14, col. 2, lines 63+) that also forms a P3 pole tip on the P2 flux shaping layer.

Mallary does not teach that the P3 layer is patterned by depositing a CMP stop layer on the P3 layer, depositing at least one sacrificial layer on the CMP stop layer, shaping the P3 layer into the pole tip, and removing the at least one sacrificial layer to leave the P3 pole tip.

It is well worth noting that the P3 layer of Mallary, including the P3 pole tip, is the top or upper magnetic pole.

Cohen discloses a top pole patterning process that includes depositing a CMP stop layer (e.g. 29, 30) on a top pole layer (e.g. 24 in Fig. 3J), depositing at least one sacrificial layer (e.g. 32) on the CMP stop layer, shaping the top pole layer into a pole tip, and removing the at least one sacrificial layer to leave the pole tip (see sequence of Figs. 3G to 3J).

Regarding Claim(s) 2, Cohen further teaches within the process that the top pole layer material is NiFe (col. 5, lines 30-31).

Regarding Claim(s) 4 through 6, Cohen further teaches that the sacrificial layer is NiFe (col. 5, lines 60-65) and also includes a seed layer (e.g. 27). The sacrificial layer is created by forming a cavity surrounded by photo-resist material (e.g. 29) where the sacrificial material fills or is deposited in the cavity.

Regarding Claim(s) 7 through 9, Cohen further teaches shaping of the top pole layer is done by ion milling where the sacrificial layer is a mask and the CMP stop layer is a secondary mask. The ion milling is used to bevel sides of the top pole tip and is beveled at an angle of 15° (see Figs. 3F to 3J, and the Tilt angle at Table in col. 6).

The benefits of the overall pole patterning process of Cohen allows better pole alignment between upper and lower poles with increased data storage densities (col. 3, lines 3-5) and

provides a CMP stop layer and sacrificial layer that is more controllable and readily removable (col. 2, lines 66-68).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to have modified the method of Mallary by utilizing the top pole patterning process of Cohen to pattern the P3 layer of Mallary, in order to provide the benefits of better pole alignment with increased data storage densities and a patterning technique that is more controllable and readily removable.

Aboaf shows that it is well known in the art to encapsulate the top or upper magnetic pole, along with the upper magnetic pole tip, with a protective layer (e.g. 42, Fig. 2) to simply protect and cover the upper magnetic pole.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to have modified the method of Mallary by adding the well known step of encapsulating the P3 pole tip (i.e. upper magnetic pole and pole tip) with a protective layer, as taught by Aboaf, to protect and cover the write pole, P3 layer, and P3 pole tip.

5. Claims 3 and 13 are rejected under 35 U.S.C. 103(a) as being unpatentable over the combination of Mallary et al, Cohen et al, and Aboaf et al, as applied to Claim 1 above, and further in view of Tran et al 5,853,900.

Mallary, as modified by Cohen and Aboaf, discloses a manufacturing method as relied upon above. The modified Mallary method does not teach that the CMP stop layer is made of  $Al_2O_3$ , i.e. aluminum oxide, and that the CMP stop layer matches the material of the encapsulating material.

It is noted that the encapsulating material of Aboaf is an insulating material and one of the materials of the CMP stop layer material of Cohen is a photoresist.

Tran shows that it is known to utilize aluminum oxide as a photoresist material (col. 7, lines 6-14) and that aluminum oxide is a well known and conventional insulating material.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to have modified the processes of Mallery, Cohen and Aboaf, by utilizing aluminum oxide ( $\text{Al}_2\text{O}_3$ ) as the material for both the CMP stop layer and the encapsulating material to provide the necessary patterning material in shaping of the P3 layer and to insulate the P3 layer.

6. Claim 10 is rejected under 35 U.S.C. 103(a) as being unpatentable over the combination of Mallery et al, Cohen et al, and Aboaf et al, as applied to Claim 1 above, and further in view of Ohtsu et al 200400520009.

Mallery, as modified by Cohen and Aboaf, discloses a manufacturing method as relied upon above. The modified Mallery method does not teach that the finished pole tip has a width less than 200 nm.

Ohtsu shows that a finished pole tip can be at 200 nm or less (paragraph [0049]) to improve the bias state.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to have modified the P3 pole tip of Mallery by shaping it to a 200 nm width or less, as taught by Ohtsu, to provide a narrow track width for improving the bias state.

***Response to Arguments***

7. Applicant's arguments with respect to Claims 1 through 10 and 13 have been considered but are moot in view of the new ground(s) of rejection.

**NOTE:** If the applicant(s) were to recite at the end of Claim 1, something to the effect of: --wherein the step of removing the at least one sacrificial layer is performed by chemical-mechanical polishing---, this would appear to define over the art of record. The applicant(s) have support for this feature in their specification, page 10, lines 4-5. However, the applicant(s) have not claimed this feature.

***Conclusion***

8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to A. Dexter Tugbang whose telephone number is 571-272-4570. The examiner can normally be reached on Monday - Friday 7:30 am - 4:00 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Peter Vo can be reached on 571-272-4690. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

**/A. Dexter Tugbang/  
Primary Examiner  
Art Unit 3729**

June 22, 2008